

LISTING OF CLAIMS:

1(Currently Amended). A cardan joint (~~20, 20a, 20b~~) comprising:

first and second shafts (~~28~~) wherein each shaft has an end (~~32, 32a, 32b, 32c, 32d, 32e~~);

first and second universal joints (~~124, 124a, 124b, 126, 126a, 126b~~) individually connected to said first and second shafts (~~28~~) adjacent said respective ends (~~32, 32a, 32b, 32c, 32d, 32e~~);

an intermediate coupling member (~~26, 26a, 26b~~) positively connected with said first and second universal joints (~~124, 124a, 124b, 126, 126a, 126b~~) wherein each of said first and second universal joints (~~124, 124a, 124b, 126, 126a, 126b~~) and both shaft ends (~~32, 32a, 32b, 32c, 32d, 32e~~) being positioned in said intermediate coupling member (~~26, 26a, 26b~~) and wherein said intermediate coupling member comprises a tubular joint housing having a generally cylindrical housing wall presenting a generally cylindrical inner wall surface extending longitudinally between longitudinally spaced open ends of said joints housing defined by circumferentially continuous end portions of said joint housing, and wherein said open ends are about the same size as that of said inner wall surface of said joint housing; and

a centering disk (~~56, 56a, 56b, 56c~~) positioned in said joint housing ~~intermediate coupling member (26, 26a, 26b)~~ and supported radially by said inner wall surface of said joint housing between said first and second universal joints (~~124, 124a, 124b, 126, 126a, 126b~~) and having a receiving portion (~~118, 118a, 118b, 118c, 62, 62a, 62b, 62c~~) engaging both shaft ends (~~32, 32a, 32b, 32c, 32d, 32e~~) ~~characterized by said receiving portion (118, 118a, 118b, 118c, 62, 62a, 62b, 62c) being which~~ moveable longitudinally in said joint housing ~~intermediate coupling member (26, 26a, 26b).~~

2(Currently Amended). The cardan joint (~~20, 20a, 20b~~) of claim 1 wherein said centering disk (~~56, 56a, 56b, 56c~~) includes a disk member defining an aperture (~~118, 118a, 118b, 118c~~) and said receiving portion comprising a bushing (~~62, 62a, 62b, 62c~~) positioned in said aperture (~~118, 118a, 118b, 118c~~).

3(Withdrawn). The cardan joint of claim 2 wherein said bushing (~~62c~~) is movable relative to said disk member (~~56a~~).

4(Withdrawn). The cardan joint of claim 3 wherein said bushing (62c) includes a body (127) and first and second radial flanges (128, 130) extending from opposite ends of said body (127) wherein said disk member (56a) is positioned between said first and second radial flanges (128, 130).

5(Withdrawn). The cardan joint of claim 4 including a resilient washer (134) positioned surrounding said body (127) between said disk member (56a) and one of said first and second radial flanges (128, 130).

6(Withdrawn). The cardan joint of claim 4 wherein one of said first and second radial flanges (128, 130) extends transverse to said body (127) and the other of said first and second radial flanges (128, 130) extends at an acute angle relative to said body (127).

7(Withdrawn). The cardan joint (20, 20a, 20b) of claim 2 wherein said disk member (56, 56a, 56b, 56c) includes a radial groove and said bushing includes a radial flange receiving in said radial groove.

8(Currently Amended). The cardan joint (~~20, 20a, 20b~~) of claim 1 including ~~[[by]]~~ a biasing device (~~80, 80a, 80b, 134~~) urging said receiving portion (~~118, 118a, 118b, 118c, 62, 62a, 62b, 62c~~) longitudinally in said joint housing ~~intermediate coupling member (26, 26a, 26b)~~.

9(Currently Amended). The cardan joint (~~20, 20a, 20b~~) of claim 8 ~~including~~ wherein said biasing device comprises (~~80, 80a, 80b~~) ~~is further defined as~~ a spring washer (~~80, 80a, 80b~~).

10(Currently Amended). The cardan joint (~~20, 20a, 20b~~) of claim 9 wherein said centering disk (~~56, 56b, 56c~~) includes an annular notch (~~122, 122a, 122b~~) and said spring washer (~~80, 80a, 80b~~) is positioned at least partially in said annular notch (~~122, 122a, 122b~~).

Appln. No.: 10/649,022

Amdt. dated June 28, 2004

Reply to Office action of March 26, 2004

11(Withdrawn). A cardan joint (20, 20a, 20b) comprising:

first and second shafts (28) wherein each shaft has an end (32, 32a, 32b, 32c, 32d, 32e);

first and second universal joints (124, 124a, 124b, 126, 126a, 126b) individually connected to said first and second shafts (28) adjacent said respective ends (32, 32a, 32b, 32c, 32d, 32e);

an intermediate coupling member (26, 26a, 26b) positively connected with said first and second universal joints (124, 124a, 124b, 126, 126a, 126b) wherein each of said first and second universal joints (124, 124a, 124b, 126, 126a, 126b) and both shaft ends (32, 32a, 32b, 32c, 32d, 32e) being positioned in said intermediate coupling member (26, 26a, 26b); and

a centering disk (56, 56a, 56b, 56c) positioned in said intermediate coupling member (26, 26a, 26b) between said first and second universal joints (124, 124a, 124b, 126, 126a, 126b) and having a receiving portion (118, 118a, 118b, 118c, 62, 62a, 62b, 62c) engaging both shaft ends (32, 32a, 32b, 32c, 32d, 32e) characterized by said centering disk (56, 56a, 56b, 56c) comprising a plurality of support tabs (82, 150, 150a, 158, 158a) for supporting bearing engagement between said centering disc (56, 56a, 56b, 56c) and said intermediate coupling member (26, 26a, 26b).

12(Withdrawn). The cardan joint (20, 20a, 20b) of claim 11 wherein said plurality of support tabs (150, 150a, 158, 158a) extend along a longitudinal axis of said disk member (56, 56b, 56c).

13(Withdrawn). The cardan joint (20, 20a, 20b) of claim 11 wherein said plurality of support tabs (82, 150, 150a, 158, 158a) are spaced in mirrored relation to one another.

14(Withdrawn). The cardan joint (20, 20a, 20b) of claim 11 wherein each of said plurality of tabs (158, 158a) include an axial surface and a radial surface and said axial surface contacts said intermediate coupling member (26, 26a, 26b).

15(Withdrawn). The cardan joint (20, 20a, 20b) of claim 11 wherein each of said plurality of support tabs (150, 150a) include an axial surface (156) and a radial surface

Appln. No.: 10/649,022

Amdt. dated June 28, 2004

Reply to Office action of March 26, 2004

(154) and said radial surface (154) contacts said intermediate coupling member (26, 26a, 26b).

16(Withdrawn). The cardan joint (20, 20a, 20b) of claim 11 wherein said plurality of support tabs (82) extend radially from said disk member (56a).

17(Currently Amended). A cardan joint (~~20, 20a, 20b~~) comprising:

first and second shafts ~~[[(28)]]~~ wherein each shaft has an end (~~32, 32a, 32b, 32c, 32d, 32e~~);

first and second universal joints (~~124, 124a, 124b, 126, 126a, 126b~~) individually connected to said first and second shafts ~~[[(28)]]~~ adjacent said respective ends (~~32, 32a, 32b, 32c, 32d, 32e~~);

an intermediate coupling member (~~26, 26a, 26b~~) positively connected with said first and second universal joints (~~124, 124a, 124b, 126, 126a, 126b~~) wherein each of said first and second universal joints (~~124, 124a, 124b, 126, 126a, 126b~~) and both shaft ends (~~32, 32a, 32b, 32c, 32d, 32e~~) being positioned in said intermediate coupling member (~~26, 26a, 26b~~) and wherein said intermediate coupling member comprises a tubular joint housing having a generally cylindrical housing wall presenting a generally cylindrical inner wall surface extending longitudinally between longitudinally spaced open ends of said joint housing defined by circumferentially continuous end portions of said joint housing, and wherein said open ends are about the same size as that of said inner wall surface of said joint housing; and

a centering disk (~~56, 56a, 56b, 56c~~) positioned in said joint housing ~~intermediate coupling member (26, 26a, 26b)~~ between said first and second universal joints (~~124, 124a, 124b, 126, 126a, 126b~~) and supported radially by said inner wall surface of said joint housing and having a receiving portion (~~118, 118a, 118b, 118c, 62, 62a, 62b, 62c~~) engaging both shaft ends (~~32, 32a, 32b, 32c, 32d, 32e~~); and

a spring (~~60, 60a, 60b~~) positioned in said joint housing ~~intermediate coupling member (26, 26a, 26b)~~ between said shaft ends (~~32, 32a, 32b, 32c, 32d, 32e~~).

Appln. No.: 10/649,022
Amdt. dated June 28, 2004
Reply to Office action of March 26, 2004

18(Currently Amended). The cardan joint (~~20, 20a, 20b~~) of claim ~~[[16]]~~ 17 wherein said spring (~~60, 60a, 60b~~) is positioned in said receiving portion (~~118, 118a, 118b, 118e, 62, 62a, 62b, 62e~~).

19(New). A cardan joint, comprising:

first and second universal joints each rotatable about a respective joint axis and each having an inner end portion;

a tubular joint housing having a generally cylindrical housing wall defining a generally cylindrical inner wall surface that extends longitudinally of said joint housing between longitudinally spaced open ends of said joint housing defined by circumferentially continuous end portions of said housing wall;

two sets of axially aligned pin holes formed in said housing body in longitudinally spaced relation to one another and in longitudinally spaced relation to said open ends of said joint housing;

said first and second universal joints extending into said tubular joint housing through said open ends of said joint housing and each supporting a set of bearing pin members projecting from said first and second universal joints into said pin holes to establish a jointed connection between said universal joints and said joint housing for rotation of said joint housing in response to rotation of said first and second universal joints about their respective axes;

a centering disk received in said joint housing between said first and second universal joints and supported radially by said inner wall surface of said joint housing to enable rotation of said joint housing about said centering disk during operatives of said cardan joint, said centering disk having a socket portion arranged eccentrically relative to said central axis of said centering disk in which said end portions of said first and second universal joints is received to couple said end portions together through said centering disc;

said joint housing including a stop surface extending radially inwardly of said inner wall surface to limit longitudinal movement of said centering disc within said joint housing in one longitudinal direction;

a snap ring removably installed in said joint housing in longitudinally spaced relation to said stop surface on the opposite side of said centering disk to limit longitudinal movement of said centering disk within said joint housing in the opposite

Appln. No.: 10/649,022

Amdt. dated June 28, 2004

Reply to Office action of March 26, 2004

longitudinal direction and to enable the selective removal of said centering disk from said joint housing through one of said open ends upon removal of said snap ring; and

a biasing member disposed between said centering disc and one of said stop surface and snap ring and acting to constantly urge said centering disk in one longitudinal direction relative to said joint housing.

20(New). The cardan joint of claim 19 wherein said generally cylindrical open ends of said joint housing are no smaller than said generally cylindrical inner wall surface.

21(New). The cardan joint of claim 19 wherein said centering disc includes longitudinally recessed portions adjacent said socket portion for receiving a portion of said first and second universal joints when said cardan joint is moved to a greatest angle position.

22(New). The cardan joint of claim 21 wherein said universal joint is spaced from said end portions of said joint wall when said cardan joint is moved to said greatest angle position.

Appln. No.: 10/649,022
Amdt. dated June 28, 2004
Reply to Office action of March 26, 2004

IN THE DRAWINGS:

The attached sheets of drawings include changes to Figures 2, 5, 6, 9, 14, 15, 20, 23, 26 and 27 . These sheets, which includes Figures 1, 2, 5, 6, 7, 8, 9, 14, 15, 16, 17, 18, 19, 20, 23, 24, 25, 26, and 27, replaces the original sheets of drawings including the same listed Figures.

Attachment: Replacement Sheets